

Sweep Plug-In
P-141A
P-142A

KAY ELECTRIC CO.

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INSTRUCTION MANUAL
ISSUE B

RETURN TO
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SWEEP PLUG-IN
P141A
P142A

TEAR OFF AT THIS LINE

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SECTION I GENERAL INFORMATION

1.1 INTRODUCTION

The Model P-141A and P-142A Sweep Generator Plug-In Units are compatible with Kay Electric Company Marka-Sweep 1500 and Vari-Sweep 860-F Basic Rack Units. The P-141A and P-142A Heads are beat-frequency oscillators which provide a center frequency from zero to 200 KC and zero to 600 KC respectively.

Switchable sweep width ranges are available providing optimum stability at the desired sweep at all repetition rates. RF output is adjustable to 1 volt RMS output into 50 ohms. A separate marker RF OUT provides a means of coupling a portion of the swept RF to drive a marker generator plug-in unit, such as the PM-7632, (the Kay PM-7632 is available for use with the Marka-Sweep Rack). All power and driving signals are provided by the basic rack unit.

1.2 INSTALLATION

As soon as the Plug-in is received, it should be visually inspected to determine that it was not damaged during shipment. Any damage should be reported immediately to the carrier and to Kay Electric Co.

To install this unit in the basic rack, slide it into the receiving well as far as possible; then, turn the locking screw clockwise until it is tight. The power switch on the basic rack should be in the off position when installing or interchanging plug-ins so that transients will not damage the semi-conductors.

1.3 SPECIFICATIONS

	P-141A	P-142A
FREQUENCY RANGE	20 cps to 200KC	35 cps to 600KC
SWEEP WIDTH	20KC at low end 8KC at high end	50KC at low end 20KC at high end
OUTPUT	1.0volt RMS into 50 or 70 ohms	1.0volt RMS into 50 or 70 ohms
FLATNESS	± 0.5 DB over the entire range	± 0.5 DB over the entire range
DIMENSIONS	6" H x $7\frac{1}{2}$ "W x 9" D	6" H x $7\frac{1}{2}$ "W x 9" D
WEIGHT	6 lbs.	6 lbs.

SECTION II

OPERATING INSTRUCTIONS

2.1 INTRODUCTION

General operating instructions are given in the manual provided with the basic rack units compatible with the Sweep Plug-in. Only functions influenced by the Sweep Head are discussed in this manual.

2.2 OPERATING CONTROLS & TERMINALS

<u>CONTROL</u>	<u>POSITION</u>	<u>FUNCTION</u>
FREQUENCY KILOCYCLES (C8)	Variable	Sets the Center Frequency to any frequency within the range of 0-200KC (0-600KC-142A)
CENTERING (C9)	Variable	Provides a Zero Adj. for the output frequency when the SWEEP WIDTH switch is set to the NARROW position.
FINE FREQ. ADJ. (R55)	Variable	A vernier control which may provide a small variation in output frequency.
SWEEP WIDTH (S2)	Narrow-Wide	Used in conjunction with the SWEEP WIDTH control on the basic rack unit. This switch provides a variable sweep width.
LIN-LOG SWITCH (S1)	Lin-Log	Depending on the position of this switch, either linear or logarithmic sweeps will be generated.
MARKER RF OUTPUT TERMINAL (J1)		A portion of the swept RF is available here and is normally patched to the MARKER RF IN jack on the Marker Plug-in Unit.

2.3 GENERAL OPERATION

The Sweep Head should be installed in the rack unit and connected as shown in Fig. 2.1, or as described in the manual furnished with the basic rack. If an external detector is used, it is important that it has a flat response over the passband of the circuit under test.

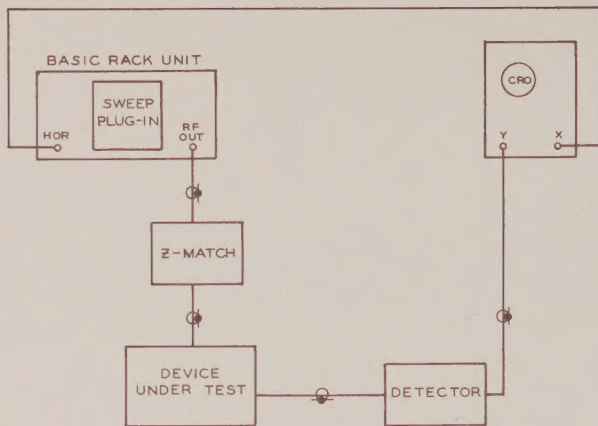


FIGURE 2.1

1. Set the FREQUENCY KILOCYCLES control to the Center Frequency of the device under test.
2. Set the LOG-LIN switch for desired sweep mode.
3. Set the SWEEP SELECTOR (on rack unit), for the desired mode of operation: LINE LOCK VAR or MAN SWP.
4. Set the SWEEP WIDTH switch on the Plug-in and the SWEEP WIDTH control (on the rack unit), for the desired sweep width. (A sweep width of 2 to 3 times the bandpass of the device under test is usually most convenient).
5. Adjust the RF LEVEL control and the RF ATTENUATOR, (both on the rack unit), for a convenient output amplitude.
6. The CENTERING and FINE FREQUENCY ADJUST controls may be utilized to provide accurate dial calibration or as vernier controls for small output frequency variations.

SECTION III MAINTENANCE

3.1 CIRCUIT DESCRIPTION

For this discussion reference may be made to Fig. 3.1 and Schematics D8981 or D9399.

A sawtooth voltage, generated in the basic rack unit is applied to cathode follower V-1 and its associated shaping network which develops either a linear or logarithmic voltage change depending on the setting of log-lin switch, S-1. The resultant output voltage is applied to varactors C1 and C2, in the collector circuit of sweeping oscillator Q-1. The varying voltage across and the capacitance of C1 and C2 causes the oscillator frequency to change within the limits established by the setting of SWEEP WIDTH switch S2 and the SWEEP WIDTH control of the rack unit. Zener diodes D15, 16 and 17 compensate for the non-linear characteristics of the varactors.

The oscillator output is passed thru blanking diodes D1, 2, & 3 to amplifiers Q2 and Q3. During CRO retrace time, a blanking pulse is developed in the rack unit and is passed thru Q-6 and is present at diode D-2. D-2 in turn appears as a low impedance as compared to diodes D1 & D3 and the swept oscillator output is passed to ground, thus providing a zero voltage baseline at the RF output terminal. During "Blanking Off", the amplified swept oscillator output is coupled through transformer T-1 and is present at balanced modulator D4 thru D7.

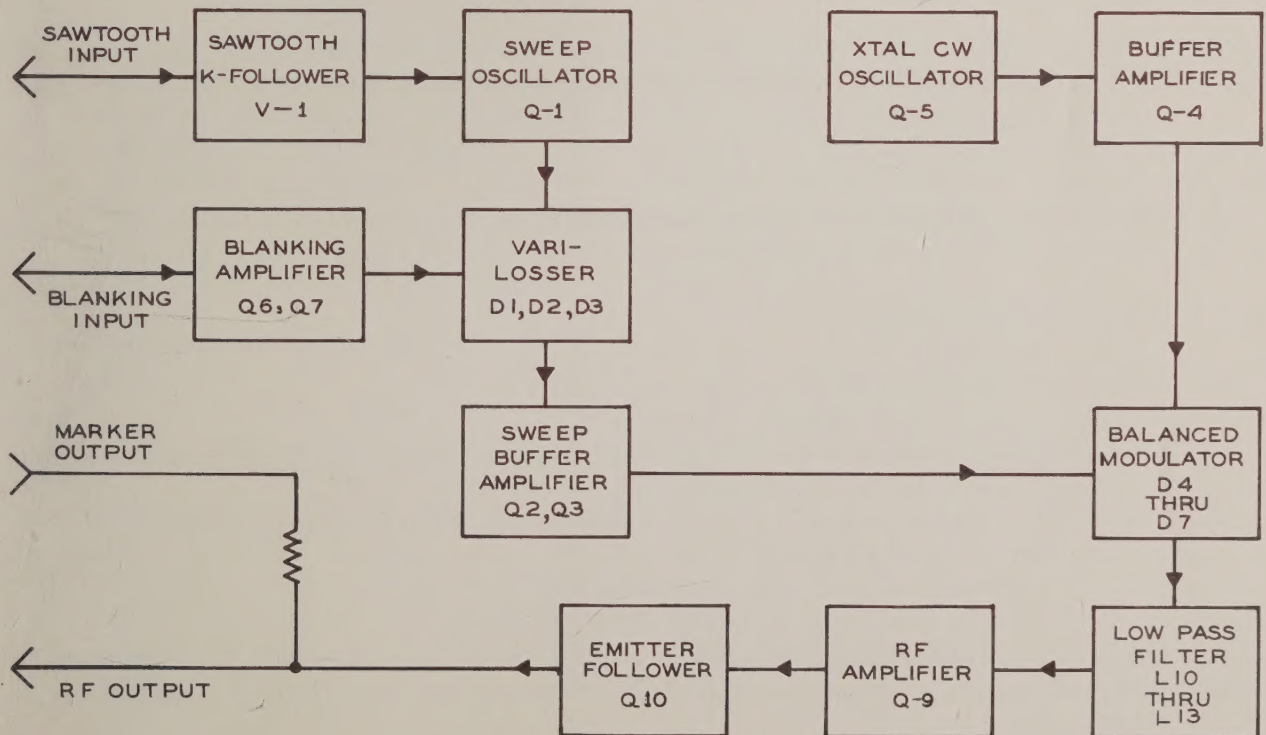


FIGURE 3.1 FUNCTIONAL BLOCK DIAGRAM

Crystal oscillator Q-5 develops a CW signal which is coupled to buffer amplifier Q-4. Pinlite I-1 is a voltage-variable resistance which maintains the proper output voltages as the RF Level control (Rack Unit) is varied over its range. The output of Q-4 is passed through T-2 and is mixed with the swept oscillator signal at modulator D-4 thru D-7. The difference frequencies are passed by low pass filter network L-10 thru L-13 to amplifier Q-9 and Emitter Follower Q-10. This Swept signal is present at RF Output connector P-2, from which it is passed to the RF Attenuator and the RF output jack on the basic rack unit. A sample of the output of buffer amplifier Q-4 is detected and fed to the metering circuits of the rack unit. A portion of the signal present at P-2 is passed to the MARKER RF OUTPUT jack and may be patched to a marker plug-in unit for processing of the desired markers.

3.2 ALIGNMENT PROCEDURE

EQUIPMENT REQUIRED:

- a. DC, VTVM, RCA Voltohmyst or equiv.
- b. Oscilloscope DC to 1 MC.
- c. Wavetraps at frequencies of 200 cps, 2, 5, 10, 20, 50, 100, 200, and 600 KC.
- d. AC VTVM Ballantine Model 300 or equiv.
- e. Extension Patch Cords to permit operation of the Plug-in outside the rack.

PRELIMINARY: Set all internal tuning controls, (i.e. - pots, coils, trimmers) to mid-range.

3.2.1 POWER SUPPLY

- a. Connect the DC VTVM between the junction of R90 and R92 and ground.
- b. Adjust 22V. ADJ., R93, for a reading of +22 volts on the VTVM.

3.2.2 CRYSTAL OSCILLATOR

- a. Set the RF LEVEL control on the basic rack to its fully clockwise position.
- b. Adjust C-33 and C-24 for maximum indication on the RF Level Meter.

3.2.3 SWEEP OSCILLATOR

- a. Connect equipment as shown in Fig. 3.2.
- b. Center the trace on the scope.
- c. Set the FREQUENCY KILOCYCLES control fully clockwise, the SWEEP WIDTH switch to WIDE and the LOG-LIN switch to LIN.
- d. Set the CENTERING and FINE FREQUENCY ADJ. controls to MID-RANGE.
- e. Set the Rack controls as follows:
 - SWEEP SELECTOR - VAR 5-25
 - SWEEP WIDTH - fully cw
- f. Set L1 and L2 at minimum inductance.
- g. Adjust L1 and L2 alternately, a few turns at a time, until Zero Beat is centered on the scope trace.
- h. Set SWEEP WIDTH switch to NARROW position.
- i. Select R66 until Zero Beat remains centered on the scope trace.

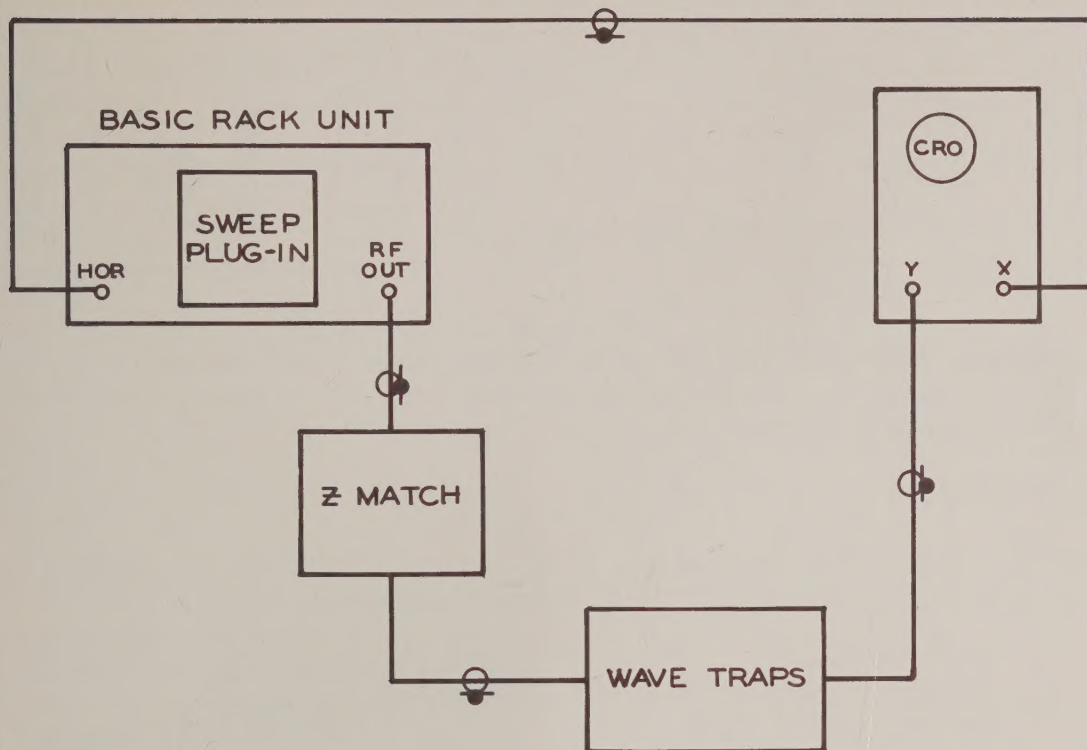


FIGURE 3.2

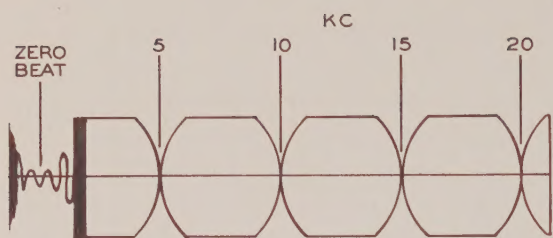
- j. Set the SWEEP WIDTH control fully counterclockwise. Rotate the CENTERING control until the Zero Beat is again centered on the trace. Set the SWEEP WIDTH control FULLY cw. The Zero Beat should remain centered on the scope trace ($\pm 10\%$).
- k. Switch in the 200 KC Wave Trap (600 KC - 142A).
- l. Rotate the FREQUENCY KILOCYCLES control to its maximum ccw position and note that the 200KC (600KC-142A) suckout appears before the control reaches stop position.

3.2.4 LINEARITY AND SWEEP WIDTH

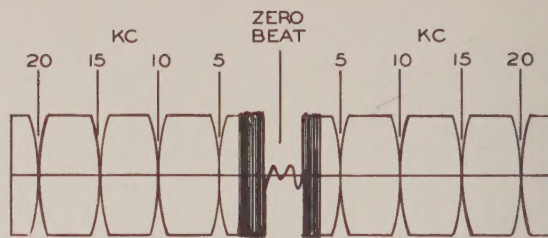
- a. Set controls as follows:

LOG-LIN switch	-	LIN
SWEEP WIDTH switch	-	WIDE
SWEEP WIDTH control (rack)	-	FULLY CW
SWEEP SELECTOR	-	VAR 5-25
SWEEP RATE control	-	FULLY CCW

- b. Connect equipment as shown in Fig. 3.2.
- c. Switch in the 5, 10, 15, and 20 KC Wave Traps.
- d. Rotate the FREQUENCY KILOCYCLES control so that the Zero Beat appears on the extreme left-hand side of the trace. (On P142, set the zero beat in the center of the trace).
- e. Adjust LIN ADJ., R58, so that the Zero Beat and the 5, 10, 15, and 20 KC suckouts are equally spaced across the scope trace (Fig. 3.3).
- f. Select R43, if necessary, to obtain 20KC Sweep Width (40KC minimum-P142).
- g. Set the SWEEP WIDTH switch to NARROW.



P141A



P142A

FIGURE 3.3

- h. Rotate the FREQUENCY KILOCYCLES control so that the Zero Beat falls on the extreme left-hand side of the trace and see that the 5KC (10KC-P142) suckout appears near the right-hand side of the trace.

3.2.5 LOG SWEEP

- a. Connect equipment as shown in Fig. 3.2.
- b. Set controls as in Step 3.2.4 with the following exceptions:

LOG-LIN switch	-	LOG
SWEEP SELECTOR	-	VAR 1-5
SWEEP RATE control	-	2 CPS REP RATE (approx.)
- c. Switch in the 200 cps, 2KC and 20KC Wave Traps. (P142-500cps, 5KC, 50KC).
- d. Select R48, R49 and/or R50 so that the suckouts are equally spaced on the trace.

3.2.6 OUTPUT, METER, FLATNESS

- a. Connect equipment as shown in Fig. 3.2.
- b. Set controls as in Step 3.2.4. Set RF LEVEL control fully clockwise.
- c. Adjust C-23 for optimum flatness.
- d. Connect equipment as shown in Fig. 3.4.
- e. Set the FREQUENCY KILOCYCLES control to 100KC (300KC-P142).
- f. Set the RF LEVEL control fully cw. Select R2 for a 1.0 volt RMS output reading on the AC VTVM.
- g. Set the RF LEVEL control fully ccw. Select R1 so that the output is a 6DB down from the reading obtained in Step "f".
- h. Repeat Steps "f" and "g" until optimum readings are obtained.
- i. Adjust METER ADJ., R41, for a 1.0 volt Rack Panel Meter reading.
- j. Set the RF LEVEL control fully cw. Rotate the FREQUENCY KILOCYCLES control through its entire range. Reading should vary not more than ± 0.5 DB around the 1 volt reading.

3.2.7 DIAL CALIBRATION

- a. Connect equipment as shown in Fig. 3.2 insert the 200KC Trap (600KC-P142).
- b. Set controls as in Step 3.2.4.
- c. Set the FREQUENCY KILOCYCLES dial to ZERO.
- d. Adjust C5 so that the Zero Beat falls in the center of the trace.
- e. Set the FREQUENCY KILOCYCLES control to 200KC. (600KC-P142).
- f. Adjust L1 so that the 200KC or 600KC trap falls in the center of the trace.
- g. Repeat steps "c" thru "f" until proper dial tracking is obtained.

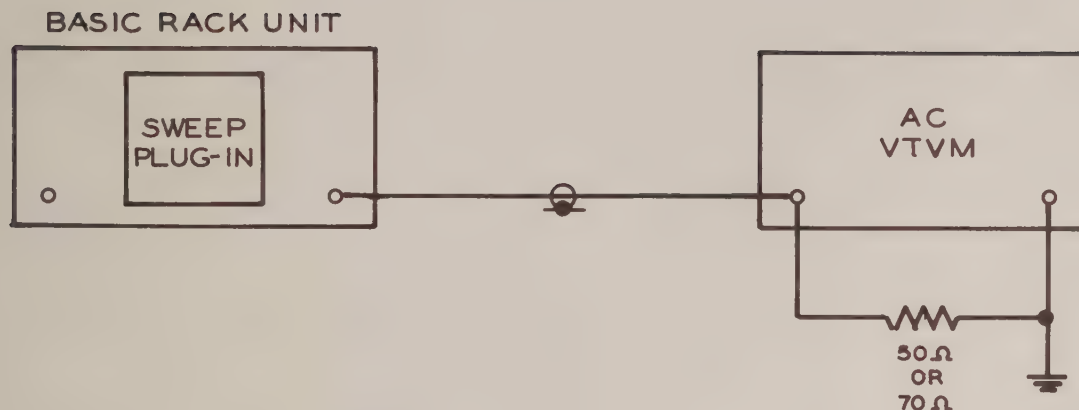


FIGURE 3.4

3.2.8 MARKER RF OUTPUT

- a. Set controls as in Step 3.2.4.
- b. Connect AC VTVM to the MARKER RF OUT jack.
- c. See that the output is approximately 0.3 volts RMS.

3.3 VISUAL INSPECTION

The P-141A & P-142A Sweep Plug-in should be visually inspected regularly, usually during periodic maintenance checks, for such things as loose or broken connectors, or cracked terminal strips. Signs of overheating such as scorched wires or resistors, discolored casings or melted wax may indicate other less apparent troubles.

3.4 PARTS REPLACEMENT

Most components of the Sweep Plug-in are easily accessible and require no special replacement procedures. However, since some of the solid-state components used may be damaged when subjected to intense heat, avoid overheating when soldering the leads of these components. longnose pliers may be used as a heat sink between the component and the tip of the soldering iron. The soldering iron should be hot before touching the solder joint and removed immediately after the solder flows. The tip of the iron should be electrically at ground potential so that semiconductor components having low voltage ratings will not be damaged.

3.5 TROUBLESHOOTING DATA

This section contains voltage charts and general information as an aid to repair and servicing. In addition, you may refer to the schematic diagram for sawtooth waveshapes. If it is determined that a function of the Sweep Plug-in is not within specifications, it is wise to check the alignment procedure before attempting to troubleshoot the circuit. Any time the power supply has been adjusted, a check of the plug-in characteristics should be performed in order to assure the accuracy of the instrument. For this discussion we will assume that the circuits of the basic rack unit are functioning correctly.

NO RF OUTPUT IN ANY SWEEP MODE; METER INDICATES ONE VOLT OUTPUT

Connect the vertical axis of an oscilloscope to the junction of C1, C2 and C4 and see that the proper waveshape is obtained (see schematic). If this voltage is abnormal, check the sawtooth cathode follower, V-1, the condition of diodes D14 thru D17, and varactors C1 and C2. Refer to Figure 3.5 for the approximate DC levels of V-1.

V-1	PIN	1	2	3	6	7	8
DC VOLTS		+250	+92	+96	+250	+95	+95

Figure 3.5

If the sawtooth voltage is normal, check sweep oscillator Q1, amplifiers Q2, Q3 and Q9 and emitter follower Q10. Check also the modulator diodes, D4 thru D7, and low pass filter L10 thru L13 for continuity. Refer to Figure 3.6 for typical DC levels.

TRANSISTOR	EMITTER	BASE	COLLECTOR
Q1	3.1	2.9	15
Q2	2.3	2.9	20
Q3	2.1	2.7	19
Q9	0.8	1.4	22
Q10	13.2	14.	5

Figure 3.6

RF OUTPUT IS ABNORMAL; METER DOES NOT INDICATE PROPER OUTPUT

Check xtal oscillator Q5 and buffer amplifier Q4 for proper operating conditions. Also, check the continuity of variable resistance I1. Approximate levels are given in Fig. 3.7.

TRANSISTOR	EMITTER	BASE	COLLECTOR
Q4	2.4	3.	20
Q5	3.1	3.5	16

Figure 3.7

IMPROPER LOG SWEEP; LIN SWEEP IS NORMAL

Check diodes D13, D14 and D15 and the continuity of log-lin switch S1.

NO BASE LINE DISPLAYED ON SCOPE

Check blanking amplifiers Q6 and Q7 and diodes D1, D2 and D3. Refer to Fig. 3.8 for approx. DC levels.

TRANSISTOR	EMITTER	BASE	COLLECTOR
Q6	3.7V	2.2V	9.2V
Q7	3.7V	3.7V	9.2V

Figure 3.8

RF OUTPUT NORMAL; METER READINGS ABNORMAL

Check the conditions of diodes D8 and D9 in the collector circuit of cw buffer amplifier Q4.

NO 22V SUPPLY VOLTAGE

Check transistors Q11 and Q12 and the condition of transformer T3 and diodes D21 thru 24. Refer to Fig. 3.9 for approx. DC levels.

TRANSISTOR	EMITTER	BASE	COLLECTOR
Q11	22V	23V	36V
Q12	6.8V	6.8V	23V

Figure 3.9

3.6 PARTS LIST - P-141A, P-142A

To insure satisfactory performance, use only exact replacement parts when making repairs. These are available from the Kay Electric Company. Please make reference to the instrument type, serial number, circuit symbol number, and Kay Part Number when ordering.

PARTS LIST ABBREVIATIONS

CD - CERAMIC DISC
CFT - CERAMIC FEED-THRU
CH - CHOKE
CT - CERAMIC TUBULAR
EL - ELECTROLYTIC
GER - GERMANIUM

MP - MYLAR-PAPER
SIL - SILICON
SM - SILVER MICA
ST - SLUG-TUNED
VAR - VARIABLE
ZEN - ZENER

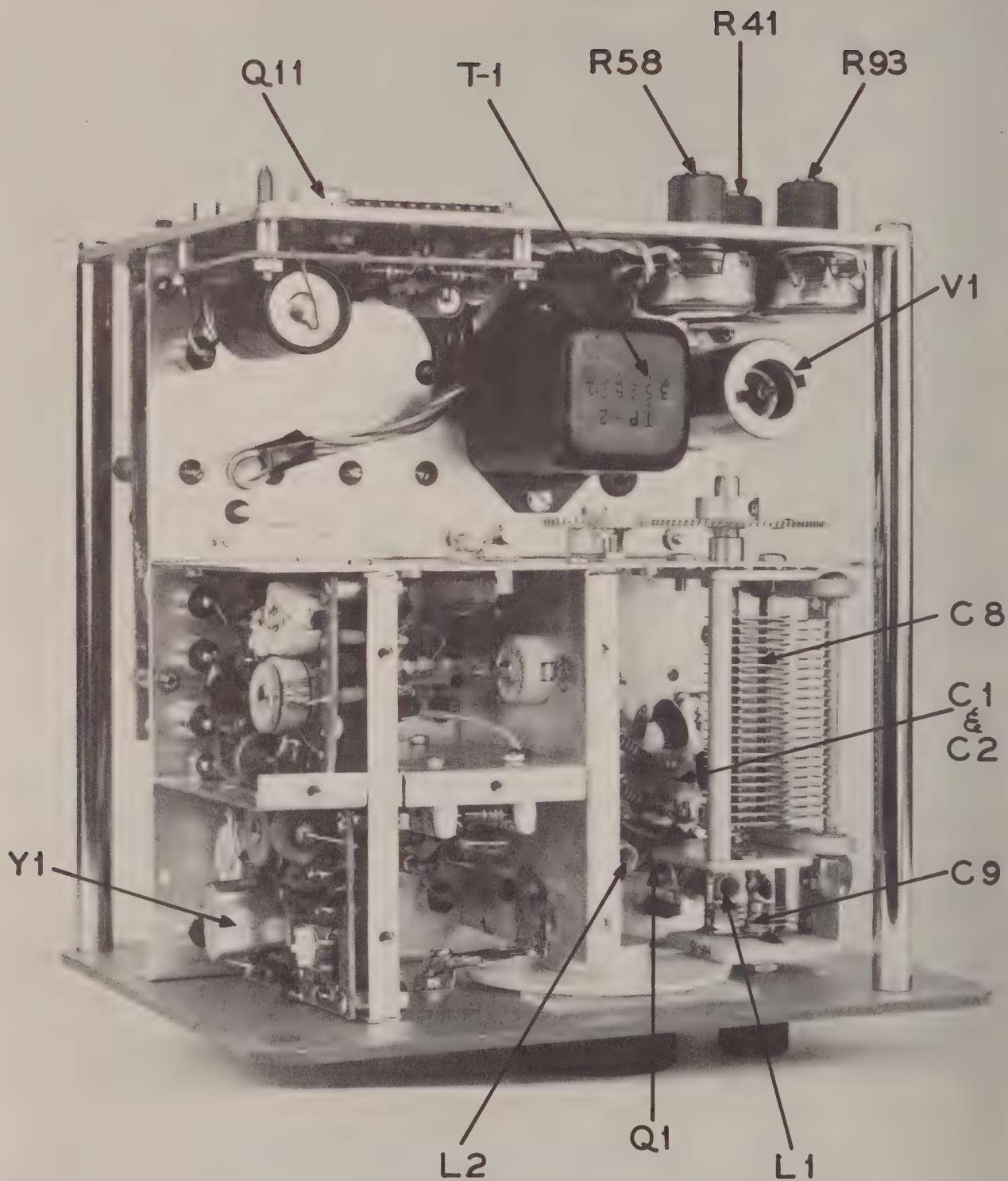


FIGURE 3.10 P141A, P142A TOP

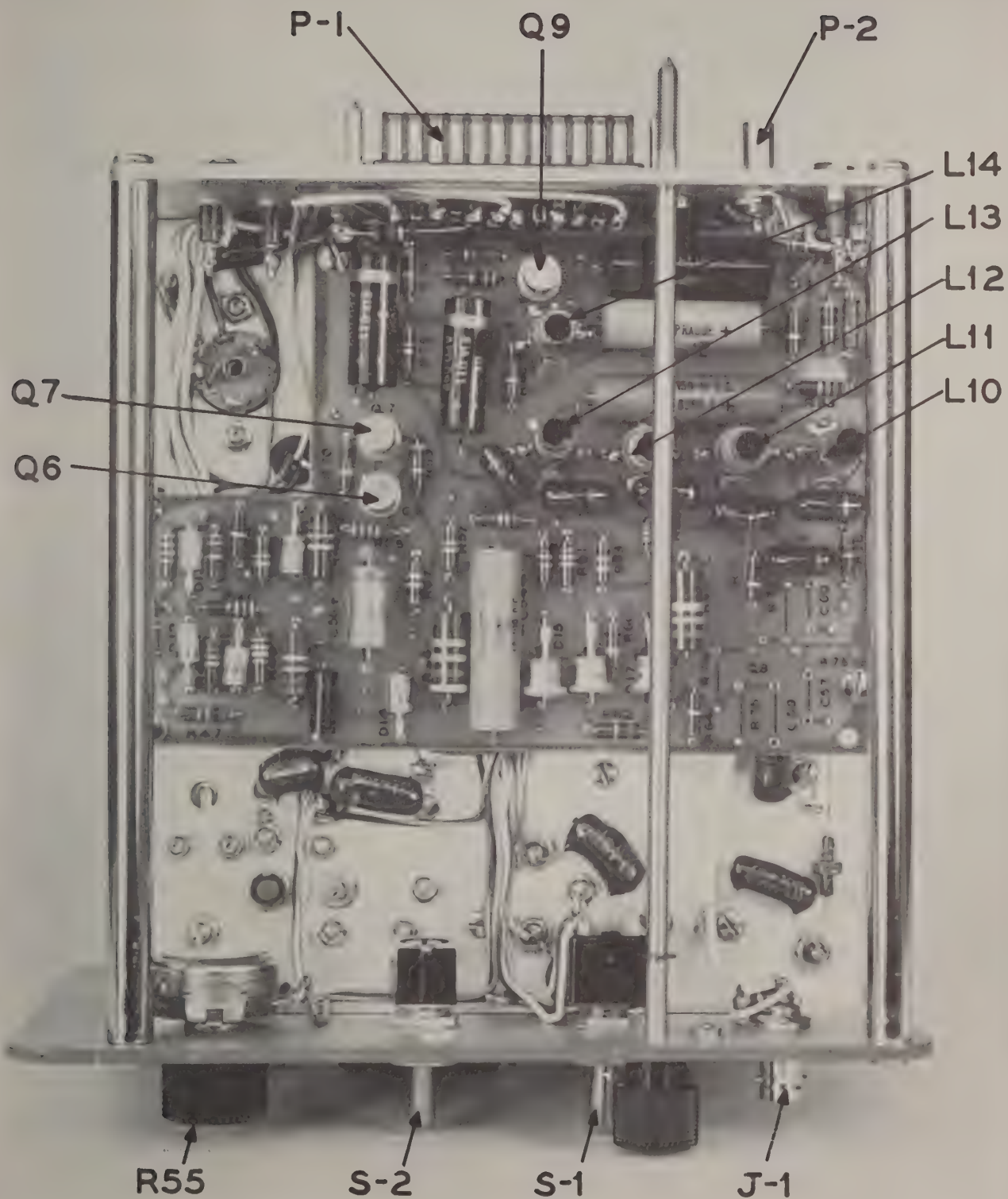


FIGURE 3.11 P141A, P142A, BOTTOM

<u>Dwg. Symbol No.</u>	<u>Description</u>	<u>Kay Part No.</u>	<u>Dwg. Symbol No.</u>	<u>Description</u>	<u>Kay Part No.</u>
Capacitors:(All capacitors are in pf, 500V. unless otherwise indicated)					
C1 & C2	Varactor, V33E	6357-83	C25	500, SM	6359-66
C3	.02 μ f, 100V MP	6899-13	*C25	200, SM	6359-63
C4	750, SM	6359-67	C26	91, SM	6359-68
*C4	250, SM	6359-57	C27	.02 μ f, 100V MP	6899-13
C5	7-45 Trimmer	6358-7	C28	.01 μ f, 100V MP	6899-12
C6	250, SM	6359-75	C29	.01 μ f, 100V MP	6899-12
*C6	300, SM	6359-64	C30	.01 μ f, 100V MP	6899-12
C7	10, SM	6359-53	C31	.02 μ f, 100V MP	6899-13
C8	VAR 15-255	9515	*C31	.01 μ f, 100V MP	6899-12
C9	VAR 3-15	1991	C32	.003 μ f, 600V MP	6899-15
C10	150, SM	6359-62	*C32	.02 μ f, 100V MP	6899-13
*C10	24, SM	6359-81	C33	7-45 Trimmer	6358-7
C11	.02 μ f, 100V MP	6899-13	C34	300, SM	6359-64
C12	300, SM	6359-64	C35	250, SM	6359-75
C13	.003, 600V MP	6899-15	C36	.02 μ f, 100V, SM	6899-13
*C13	.002, 600V MP	6899-4	C37 thru C46	4000 CFT	6356-5
C14	.01 μ f, 100V MP	6899-12	C47	.1 μ f, 100V MP	6899-11
C15	300, SM	6359-64	C48	.1 μ f, 100V MP	6899-11
*C15	200, SM	6359-63	C49	.02 μ f, 400V MP	6899-9
C16	200, SM	6359-63	C50	.05 μ f, 100V MP	6899-1
C17	390, SM	6359-65	C51	25 μ f, 3V EL	6355-121
C18	.02 μ f, 100V MP	6399-13	C52	.005, 100V MP	6899-14
C19	.02 μ f, 100V MP	6399-13	C53	.1, 100V EL	6899-11
C20	.001 μ f, 600V MP	6899-10	C54	18 μ f, 100V EL	6355-73
C21	50, SM	6359-60	C55	.1, 100V MP	6899-11
*C21	300, SM	6359-64	C56	33 μ f, 25V EL	6355-122
C22	.02 μ f, 100V MP	6899-13	C57	.002 μ f, 600V MP	6899-4
C23	7-45 Trimmer	6358-7	C58	Not used	-----
C24	7-45 Trimmer	6358-7	C59	Not used	-----

C60	Not used	-----
C61	.005 μ f, 100V MP	6899-14
*C61	.002 μ f, 600V MP	6899-4
C62	.0075 μ f, 100V MP	6899-19
*C62	.003 μ f, 600V MP	6899-15
C63	.005 μ f, 100V MP	6899-14
*C63	.002 μ f, 600V MP	6899-4
C64	.0075 μ f, 100V MP	6899-19
*C64	.003 μ f, 600V MP	6899-15
C65	.005 μ f, 100V MP	6899-14
*C65	.002 μ f, 600V MP	6899-4
C66 & C67	250 μ f, 6V EL	6355-95
C68	150 μ f, 15V EL	6355-118
C69	150 μ f, 25V EL	6355-45
C70	150 μ f, 15V EL	6355-118
C71	250 μ f, 50V EL	6355-72
C72	2 μ f, 25V EL	6355-105
C73	4000 CFT	6356-5
C74	.02, 100V MP	6899-13

Coils:

L1 & L2	Special ST	6394-15
L3	Not used	-----
*L3	100uh CH	6394-25
L4	50uh CH	6394-31
*L4	Not used	-----
L5	50uh CH	6394-31
L6 & L7	950uh CH	6394-28
L8	Special	L8/8981F
L9	50uh CH	6394-31
L10	ST	6837
L11	ST	6838
L12	ST	6838
L13	ST	6837
L14	ST	6841

Connectors:

J1	BNC, Female	451
P1	Male, 24 Terminal	7570
P2	Male	7661
Diodes:		
D1 thru D9	GER, 1N126A	6357-19M
D10	ZEN, 3/4M91Z10	6357-41
D11	ZEN, 3/4M22Z10	6357-39
D12	ZEN, 3/4M39Z10	6357-40
D13	ZEN, 3/4M47Z10	6357-61
D14	ZEN, 3/4M56Z10	6357-25
D15 thru D17	SIL, 1N538	6357-14
D18	ZEN, 1N1510	6357-7
D19	SIL, 1N457	6357-93
D20	ZEN, 1N1510	6357-7
D21 thru D24	SIL, F6	6357-3
D25	SIL, 1N457	6357-93

Resistors:(Unless otherwise specified, all resistors are fixed composition, $\frac{1}{2}$ Watt, 10% Tolerance value in ohms.)

R1 & R2	Factory Selected	-----
R3 & R4	33K	3331-E
R5	22	2201-E
R6	1K	1021-E
R7	4.7K	4721-E
R8	22K	2231-E
R9	2.2K	2221-E
R10	3.3K	3321-E
R11	330	3311-E
R12	4.7K	4721-E
R13	3.3K	3321-E

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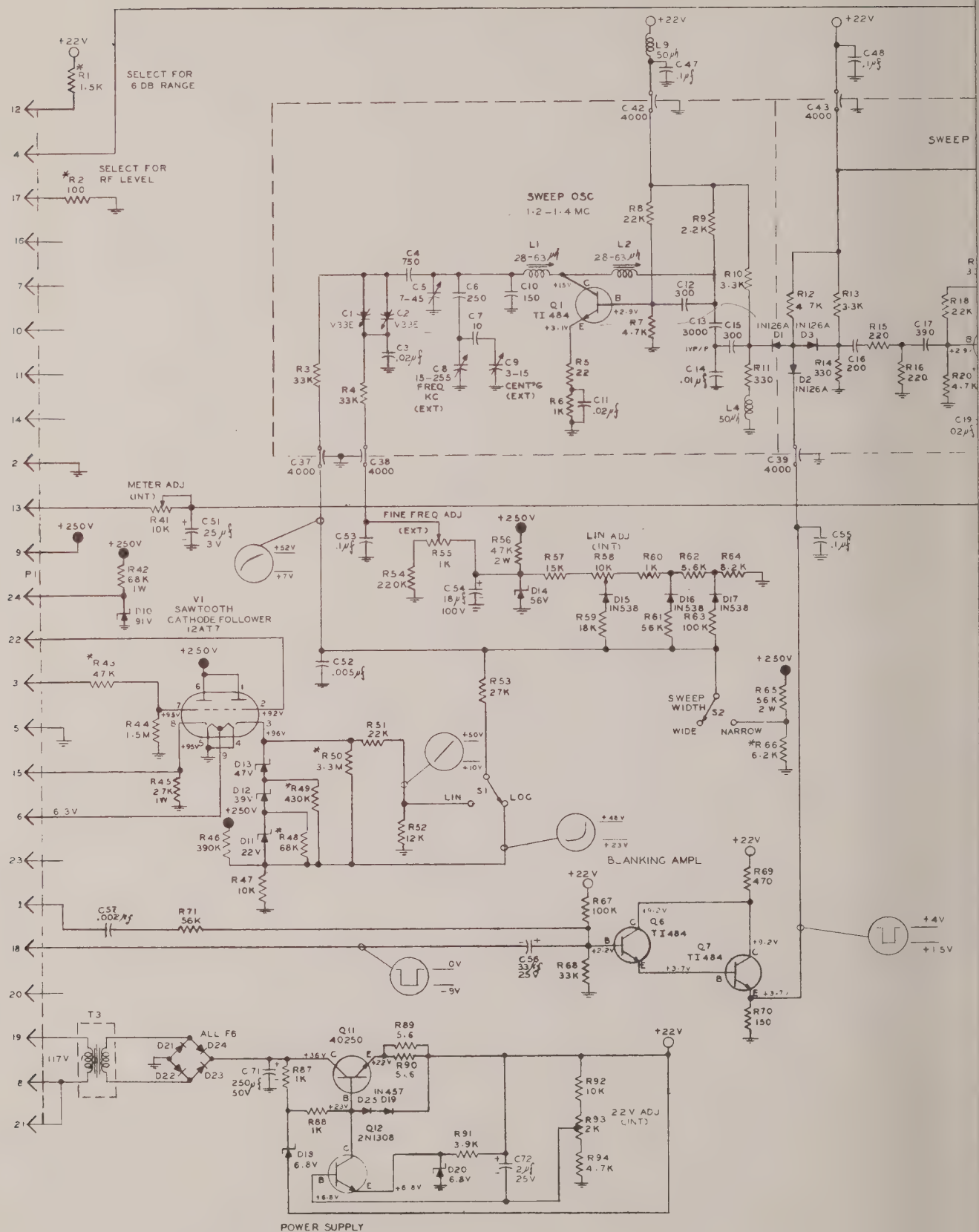
<u>Dwg. Symbol No.</u>	<u>Description</u>	<u>Kay Part No.</u>	<u>Dwg. Symbol No.</u>	<u>Description</u>	<u>Kay Part No.</u>
R14	330	3311-E	R43	Factory Selected	-----
R15	220	2211-E	R44	1. 5M	1551-E
R16	220	2211-E	R45	27K, 1 watt	2731-G
*R16	Not used	-----	R46	390K	3941-E
R17	470	4711-E	R47	10K	1031-E
R18	22K	2231-E	R48	Factory Selected	-----
R19	330	3311-E	R49	Factory Selected	-----
R20	4. 7K	4721-E	R50	Factory Selected	-----
R21	22	2201-E	R51	22K	2231-E
R22	330	3311-E	R52	12K	1231-E
R23	22K	2231-E	R53	27K	2731-E
R24	33K	3331-E	R54	220K	2241-E
R25	4. 7K	4721-E	R55	1K, 2watt pot, VAR	9122-20
R26	39	3901-E	R56	47K, 2 watt	4731-H
R27	330	3311-E	R57	15K	1531-E
R28	Factory Selected	-----	R58	10K, 2watt pot, VAR	9122-31
*R28	5. 6K	5621-E	R59	18K	1831-E
R29	470	4711-E	R60	1K	1021-E
R30	22	2201-E	R61	56K	5631-E
R31	470	4711-E	R62	5. 6K	5621-E
R32	22K	2231-E	R63	100K	1041-E
R33	4. 7K	4721-E	R64	8. 2K	8221-E
R34	27	2701-E	R65	56K, 2 watt	5631-H
*R34	18	1801-E	R66	Factory Selected	-----
R35	680	6811-E	R67	100K	1041-E
R36	22K	2231-E	R68	33K	3331-E
R37	4. 7K	4721-E	R69	470	4711-E
R38	2. 2K	2221-E	R70	150	1511-E
R39	47	4701-E	R71	56K	5631-E
R40	1K	1021-E	R72 thru R74	Not used	-----
R41	10K, 2watt pot, VAR	9122-31	R75	100	1011-E
R42	68K, 1watt	6831-E	R76	10	1001-E

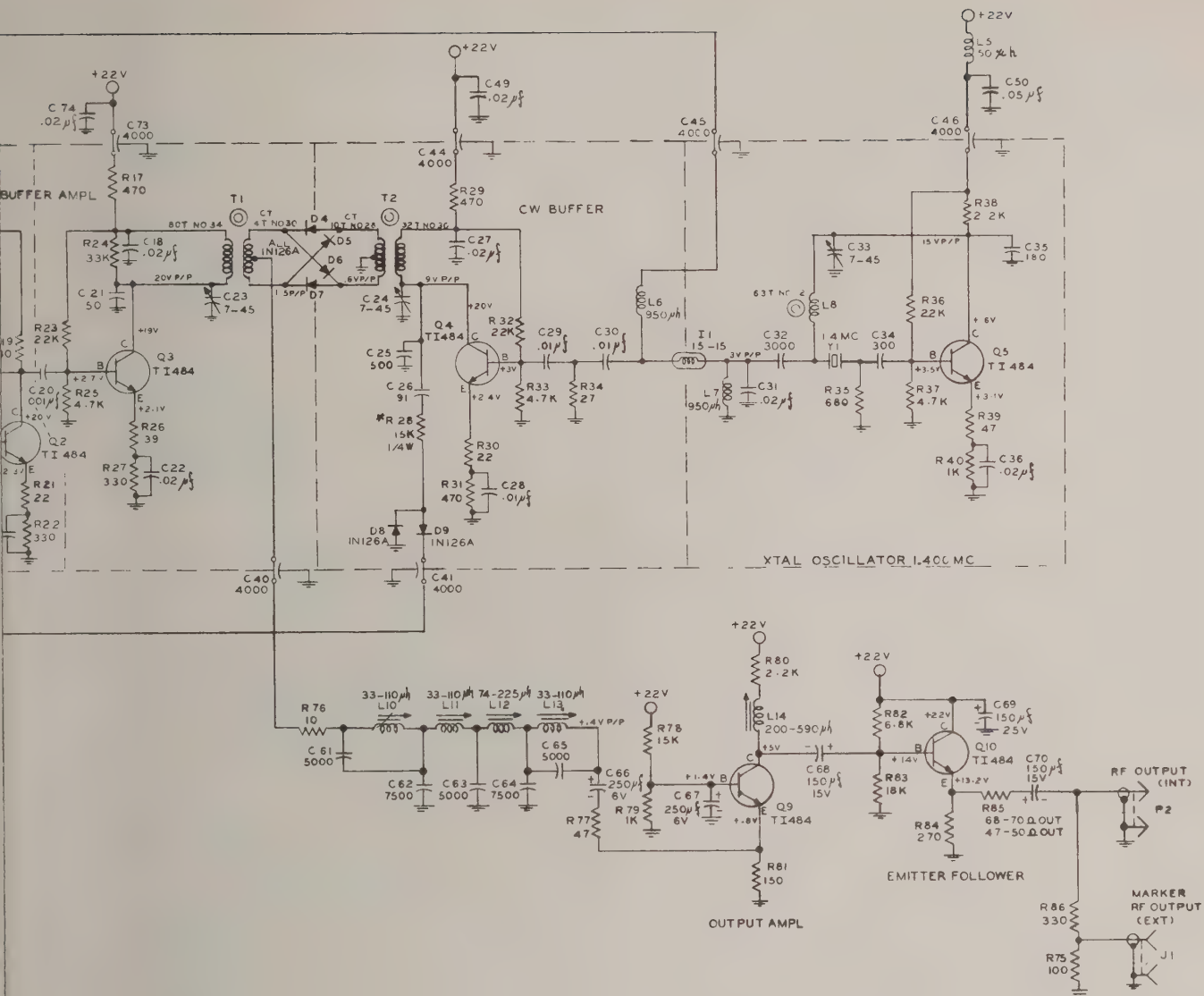
R77	47	4701-E	Transistors:		
*R77	33	3301-E			
R78	15K	1531-E	Q1 thru Q7	TI484	K-130
R79	1K	1021-E	Q8	Not used	-----
R80	2. 2K	2221-E	Q9 & Q10	TI484	K-130
R81	150	1511-E	Q11	40250	K-160
R82	6. 8K	6821-E	Q12	2N1308	K-133
R83	18K	1831-E			
R84	270	2711-E	Transformers:		
*R84	220	2211-E			
R85	47	4701-E	T1	Special	T1/8981F
R86	330	3311-E	T2	Special	T2/8981F
*R86	4. 7K	4721-E	T3	Power	6392-1
R87 & R88	1K	1021-E			
R89 & R90	5. 6, 5%	5P65-E	I1	Pinlite 15-15	15-15
R91	3. 9K	3921-E			
R92	10K	1031-E	V1	Vacuum Tube, 12AT7	12AT7
R93	2K, 2watt pot, VAR	9122-22			
R94	4. 7K	4721-E	Y1	Crystal 1, 400MC	Y1/8981F
R95	Not used	-----	*Y1	Crystal 2, 200MC	Y1/9399B
*R95	330	3311-E			

Switches:

S1	Toggle, DPDT	254-A
S2	Toggle, SPDT	255-A

*P142A

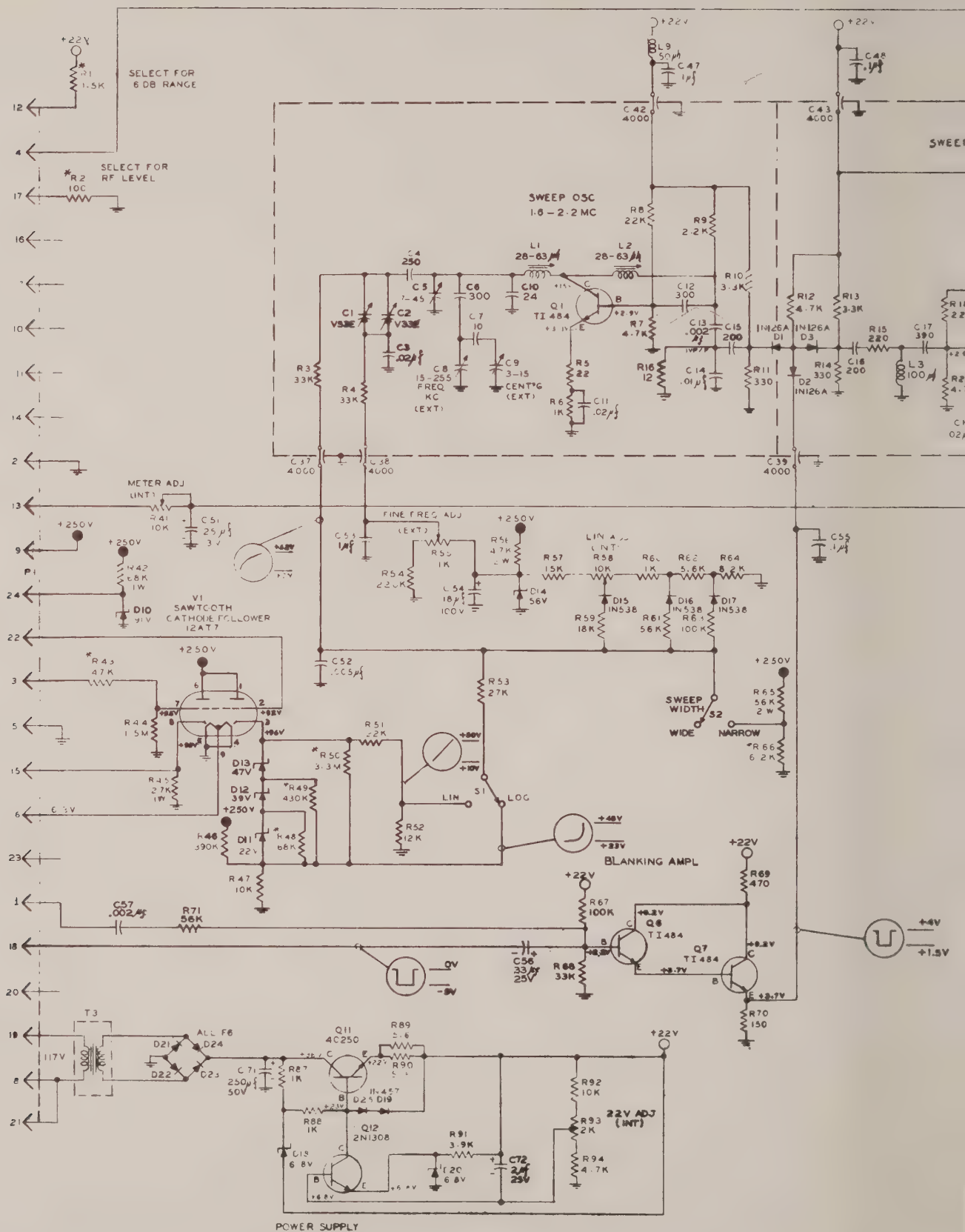


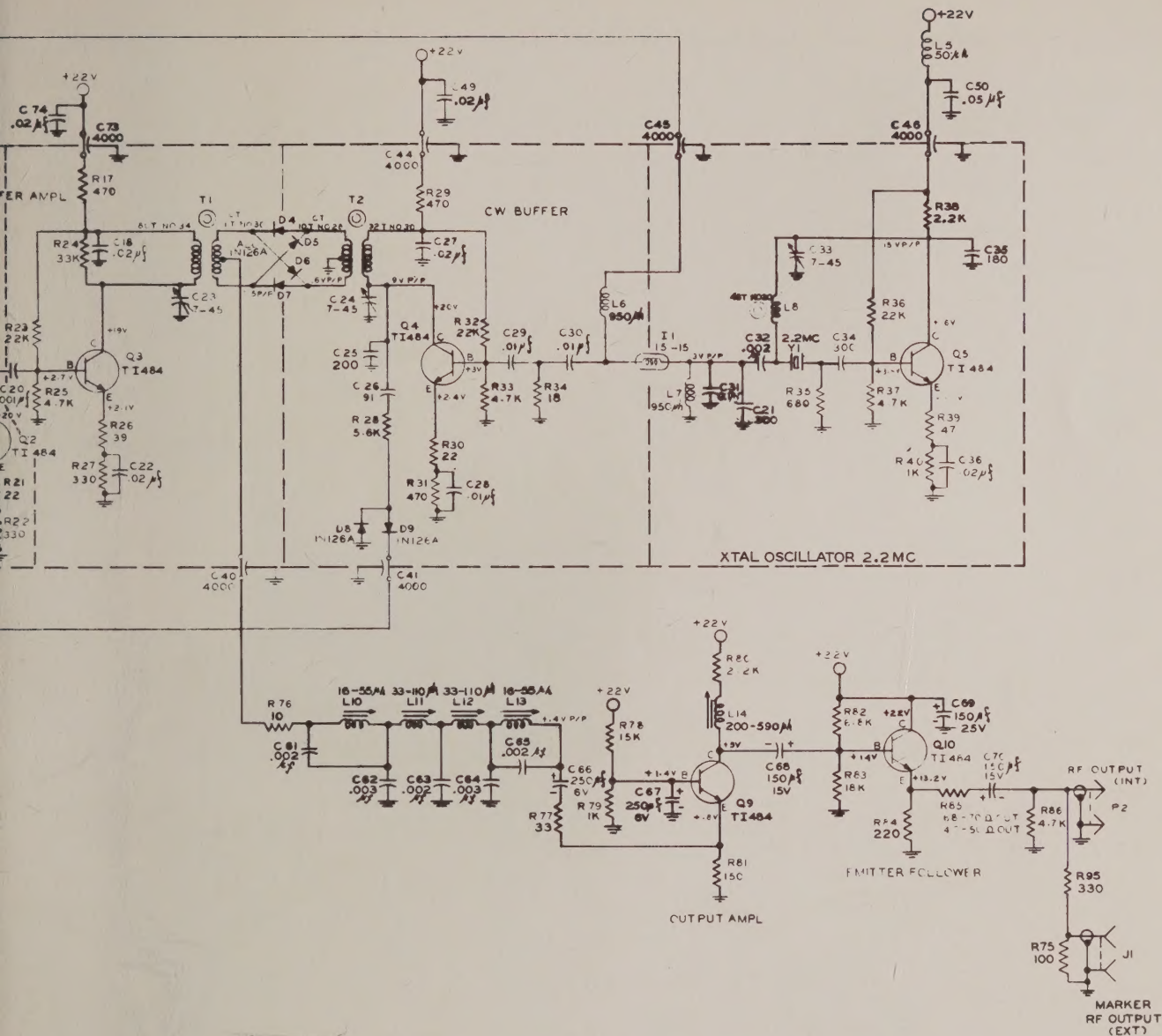


NOTE
UNLESS INDICATED OTHERWISE
ALL CAPACITANCES ARE IN $\mu\mu$
ALL RESISTANCES ARE IN OHMS 1/2W
* FACTORY SELECTED

PLUG IN UNIT
JSE WITH
MARKA-SWEEP MODEL TY 1500
VARI-SWEEP 860E

FIGURE 3.12 SCHEMATIC DIAGRAM, P141A - D-8981G





NOTE
UNLESS INDICATED OTHERWISE
ALL CAPACITANCES ARE IN $\mu\mu$
ALL RESISTANCES ARE IN OHMS 1/2 W
* FACTORY SELECTED

PLUG IN UNIT
USE WITH
MARKA-SWEEP MODELTY 1500
VARI-SWEEP 860E

FIGURE 3.13 SCHEMATIC DIAGRAM, P142A - D-9399C

3.7 RESHIPMENT INSTRUCTIONS

Permission to return equipment should, in every case, be obtained from the factory or an accredited Kay representative before return shipment is made.

If it becomes necessary to return the P-141A or the P-142A to the factory for repair, it should be securely padded to cushion the instrument during transit. A packing slip should be included in the carton furnishing identification of the shipper. The packing slip should also reference the instrument type and serial number. A statement indicating the malfunction should be included for the benefit of the service personnel.

TEAR OFF AT THIS LINE

